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GENERAL NOTE

Sometimes requests are received for printed information describing more fully an investigation mentioned in the Technical News Bulletin. Because of the current nature of much of this work, often such material cannot be supplied. However, in such cases, when the investigation has progressed sufficiently far, the Bureau will make every effort to answer specific inquiries concerning particular applications of the subject, thus avoiding the delay incident to publication.

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1 New Design of Apparatus for Determining the Permeability of Stone

Some apparatus was recently designed by the Bureau for measuring the flow of water through different kinds of stones under hydrostatic heads up to 700 feet. Specimens of the stone, prepared in the form of discs 8 inches in diameter and 1/2 inch thick, are placed in the apparatus, after which water under the desired pressure is brought in contact with one face of the stone. The water is forced through the pores of the stone, and the part passing through a definite area of the specimen is collected and measured at certain intervals to determine the rate of flow.

Several types of apparatus have been employed heretofore in determining the permeability of concrete, but the high pressures required to cause an appreciable flow through the dense igneous rocks necessitated an entirely different design. The use of gaskets which, in this type of apparatus, are a source of trouble and uncertainty has been eliminated.

The desired water pressures are obtained and measured by means of an accumulator which eliminates the possibility of fluctuations in pressure and also the errors incident to pressure gage readings. The only difficulty experienced so far with this apparatus was caused by breakage of some of the specimens under the high pressures.

2 Thermal expansion of Stone

The determination of the thermal expansion of stone, i.e., the amount which the stone changes in dimensions with changes in temperature, has received very little attention in this country. Furthermore, an examination of the available data on the subject will reveal the fact that the few determinations which have been made are usually based on a very limited number of observations, and are rather misleading. The values most frequently cited in text books and hand books are based on coefficients obtained by measuring the length of specimens at normal temperature. The assumption has been made that the material expands at a uniform rate at all intermediate temperatures. Determinations at the Bureau of Standards, in which frequent length measurements were made on limestone and marble specimens as the temperature was raised, indicate that these old assumptions are far from correct. For small increases in temperature above the normal the expansion is very small, but the rate increases rapidly as the temperature rises. At 100°C the average expansion of marble is about the same as that of steel, but at 200°C the rate is approximately doubled, while for temperatures a few degress above the normal the expansion is only a fractional part of that of steel. These peculiarities are of particular interest where stone is used in connection with other materials, as is usually the case in modern building construction.

Marble, especially, shows other peculiarities in its behavior under temperature changes. It expands on heating but when cooled to the original temperature it does not shrink to its original dimensions, i.e., it retains a part of the expansion as a permanent growth. Specimens have been measured under low temperatures and found to expand when cooled below the normal, which is also contrary to the usual conception. Such properties are probably the cause of the peculiar instances of warping which are sometimes noted in marble headstones in cemeteries.

3 Production of Hydraulic Lime

Each year considerable quantities of hydraulic lime are imported into the United States. It is therefore obvious that if this material could be produced economically from domestic resources, which are available, it would result in a saving to the users and would open for development an industry which is not active at present. After the Bureau had studied the literature on the subject it appeared entirely possible to produce such a material from the quality of limestone which is always present to a more or less extent in limestone workings but which is not suitable for the production of good lime. There was very little definite information at hand, however, on the exact composition of

stone necessary or the time and temperature of burning. The determination of these conditions has been made the subject of an investigation and some very interesting results have been obtained.

Samples of limestone of the composition which seemed necessary for the production of hydraulic lime were obtained from several manufacturers of lime. Results obtained by other investigators indicated that a burning temperature in excess of 1350°C (2462°F) would be required. However, when the stones were burned at this temperature and the products of calcination were hydrated, no hydraulic properties were exhibited, nor even setting properties in the air.

The temperature of burning was then lowered to 1200°C (2192°F), and a product resulted which would set in from four to six hours in the air but had the undesirable property of dusting when dry. Slight hydraulic properties only were exhibited by this material.

The burning temperature was still further reduced to 1120°C (2048°F) with a burning period of four hours, and a material was obtained which had some of the desired characteristics. It hydrated readily, and when made into a 1:3 mortar would set under water over night. Furthermore, the unexpected property of early strength when stored in air was exhibited, a set of from four to six hours as indicated by the Vicat needle being obtained, with a tensile strength of 20 lbs. per sq. in. at 7 days and 35 lbs. per sq. in. at 90 days.

Inasmuch as the burning had been done in a small furnace a sufficient quantity of material for a complete determination of all of its properties was not obtained. It is therefore proposed to continue the work on a larger scale. Additional samples of limestone have been requested, and as soon as these are received and analyzed it is hoped to obtain the necessary information for the production of a quick-setting, hydraulic lime on a commercial scale.

4 Investigation of Feldspar and Its Effect in Pottery Bodies

As part of the detailed study of each of the constituent raw materials of a normal whiteware body, the Bureau in cooperation with the American Ceramic Society and industrial users of feldspar, is investigating the physical properties of commercial feldspar and its effects in vitreous and semi-vitreous ware.

Feldspar (which is composed of potash, soda, alumina, and silica) acts as a flux at the maturing temperatures of ceramic bodies, and serves to bind the other materials into a common structure. This fluxing behavior, and the other physical characteristics of the feldspar, vary within considerable limits, and a systematic and exhaustive study of

their behavior in such bodies is desirable in order that industrial users may have reliable data to guide them in the selection of material possessing the desired qualities.

The investigation is divided into two major parts. The first is in cooperation with several technical institutions, and will involve the determination of softening point, fusion point, screen analysis, and chemical composition. It is proposed to have the work on softening points, air analyses, and chemical analyses conducted by outside technical institutions as well as in the Bureau's laboratories, in order to obtain information on the normal error encountered in determinations of this kind.

The second part of the investigation comprises tests of physical character which are comparable with tests conducted in previous Bureau investigations on ball clay, whiting ($CaCO_3$), and flint (SiO_2). This will include a study of the effect of natural impurities in the feldspar on its viscosity at furnace temperatures, and will involve the following determinations on bodies containing the various feldspars: drying shrinkage; burned color; maturing range; resistance to chipping, impact, and temperature change.

Up to the present time 17 feldspars have been submitted for use in the investigation. Representative samples from each shipment have been submitted to the cooperating institutions and to the Bureau's laboratories for the determination of fusion points and grain fineness. The air analyzer will be used for the latter work. Results from screen analysis and softening point determinations have been received from one cooperating laboratory, and the last-named results check closely those obtained at the Bureau. It is expected that the results from the major portion of the laboratory work of this investigation will be available in the course of approximately six months. The data so far obtained do not warrant the formation of any conclusions.

5 Cordage Standardization

Recent experimental work at the Bureau of Standards has shown that the physical properties of rope are greatly influenced by variations in the physical makeup, including twist, size of yarn, lay, and protective coatings. The study of the effects of these variables has been made possible by the design and construction of two machines, one of which tests the individual yarns, and the other, the completed rope.

The preliminary work on the yarn testing machine has been completed, and a standard method of test adopted. Research is under way on the sensitivity of the machine to slight changes in the above mentioned variables. The effect upon the yarn of varying amounts of oil and acids will also be studied.

The machine for testing the completed rope is in proc- of construction, and when finished the standardization of the variables will be undertaken.

A complete study of the micro-chemical analysis and identification of the common cordage fibers is likewise being made. Preliminary results indicate that this will ultimately prove an important aid in routine fiber identification.

A machine has also been constructed for subjecting sash cord to a service test. Sash cord is the most important of the various kinds of soft-fiber cordage. Preliminary tests on this machine have just begun, and it is proposed to test a large number of samples with the object of standardizing the machine and methods of test.

Summarizing the work, a combination of tests is being devised which when completed will make possible a complete analysis, both physical and chemical, of cordage, and will set definite standards for its working value.

6 Effect of Twist on the Physical Properties of a Number 7s Yarn

Before making the Pima yarn for the recent investigation conducted by the Bureau and the Post Office Department to determine the comparative wearing qualities of Pima and ordinary duck mail bags, a short investigation was carried out to determine the most suitable twist for this use.

A study was made of the relation of the twist to the contraction, yarn count, diameter, angle of twist, and the breaking strength. From the data obtained it was concluded that about 12 turns per inch would be the most desirable twist for this yarn.

The tabular and graphical relations of these results with a discussion of their significance have been prepared and it is believed that this information will be of use to the cotton manufacturer.

Copies of this publication, Technologic Paper No. 274, "The Effect of Twist on the Physical Properties of a Number 7s Yarn" may be obtained from the Superintendent of Documents for ten cents apiece.

7 Improved Apparatus for Making Uniform Sheets of Paper Fiber for Test Purposes

The construction and operation of a fiber sheet mould and press, devised by the Bureau for making uniform test sheets of fiber, are described in a report published in the Paper Trade Journal, November 20, 1924. Such apparatus plays an important part in the investigational work of paper laboratories, since test sheets, uniform as to formation and weight, are required for making strength tests of pulp. Apparatus of this kind is also of value in laboratory studies of paper manufacturing processes such as sizing, coloring, and beating.

In making hand sheets by the usual method, the hand mould is dipped into a vat containing the diluted stock, which has previously been thoroughly mixed. The deckle frame is filled and the mould is raised slowly, a shaking movement being meanwhile imparted to it. The water drains back into the vat, thus changing the concentration of the remaining stock. Another sheet taken out at this stage would be of lighter weight. It is customary to add to the vat, before taking out another sheet, stock equivalent to that removed by the previous sheet. The possibility of error in the amount added, and the personal factor in the shaking of the forming sheet tend to produce non-uniformity in the distribution of the fibers and the weight of the sheet. The apparatus described in the report reduces the variables mentioned to a minimum, producing sheets of uniform quality throughout.

The sheet mould consists of a hollow base with open top, a wire covered perforated plate which rests on the base, and a deckle box, open at top and bottom, which is clamped on the perforated plate when a sheet is being made. An outlet pipe below the base contains a quick-opening gate valve and, below this, a steam ejector valve. The sheet mould is filled with water and prepared fiber stock is distributed evenly over it. The deckle box confines the contents to a definite area, thus limiting the size of the sheet. The ejector valve and quick-opening gate valve are immediately opened, the water is quickly drawn down, and a sheet of fiber is formed on the wire mould. The sheet is then removed and placed in the press. The sheet press consists of a letter press so fastened to platform scales that the pressure on the sheet is measured by the weight required to balance the lever arm of the scales.

Results obtained with this apparatus show that the sheets made on the sheet mould are uniform; the fibers are uniformly distributed (as proved by comparison of the tensile strength, elongation, and tearing strength in two directions of the sheet); and the suction mould as constructed eliminates the many undesirable factors of the hand mould and permits duplication of a sheet as frequently as desired.

8 Tests of Solid Rubber Tires

Some very striking results were recently obtained from dynamometer tests of four 36 by 4 solid rubber tires. The tests were carried on in cooperation with one of the manufacturers of ingredients used in rubber compounding, to determine how the use of different ingredients would influence the power losses in the tires.

Each tire was run under the same conditions of load and speed for approximately three hours, power loss and tire tem-

perature measurements being taken at regular intervals during the run. A very decided difference was found in the temperatures developed in the various tires. The one which showed the lowest power loss reached a temperature of 325° at the end of 3 hours, while the tire with the highest power loss reached a temperature of 355°F, at which time the rubber on the inside of the tire disintegrated to such an extent that the tire swelled and "blew out" like a pneumatic tire.

The tests emphasize the importance of considering carefully the physical properties of rubber compounds used in building tires, and also illustrate the value of the tire dynamometer in the solutions of such problems.

9 Study of Methods for Reducing Oil Pollution of Rivers and Harbors

As its part in the effort to reduce the pollution of rivers and harbors by waste oil from vessels, the Bureau has been studying the designs of various apparatus for this purpose.

During December the Technical Section of the Fleet Corporation, U. S. Shipping Board, completed the design and construction of an oil separator which was installed on the Steamship "Western World." This vessel sailed for South America with a member of the Bureau's staff on board, who will secure accurate data on the operation of the device.

Other separators are being constructed by various firms and will be installed early this year. Their operation will be watched with interest.

10 The Minimum Temperature at Which a Mixture of Gasoline & Air Can be Kept Completely Vaporized.

From the standpoint of economy of production, it is desirable to retain in a gasoline as large a proportion of the heavy, low volatility constituents of the original crude oil as can be efficiently burned in the engine. Incomplete combustion is not only wasteful of fuel, but produces further difficulties, such as carbon formation and the thinning of the lubricating oil by dilution with unburned gasoline. Hence it is very important to have the process of refining carried to just the right point - if the point is exceeded, the production cost is unnecessarily high; if it is not reached, the saving in production cost will be more than offset by the losses due to inefficient use.

A criterion of great value in estimating the usability of a given fuel, and hence of determining the degree to which refinement should be carried to satisfy given conditions of use, is the minimum temperature at which a mixture of fuel and air such as enters the engine cylinders can be kept completely vaporized. The Bureau of Standards has made an extended investigation on this subject, which will be fully described in a forthcoming Scientific Paper. It was found that the average fuel enters the cylinder in liquid condition, i.e., as spray, unless the mixture is heated in the manifold many degrees above summer air temperature.

11 Study of Domestic Gas Appliances

The Bureau is greatly interested in improvements in the performance of domestic gas appliances.

Satisfactory progress was made during the past month on the study of the resistance of metals to corrosion under the conditions of service in a gas burner head. The determination of the composition of metal which would be most satisfactory for manufacture of such appliances as radiant heaters is a very important one.

The combustion performance of a solid top stove was studied in detail. Combustion and efficieny tests were made on two new water heaters and observations were made on one radiant heater. All these tests resulted in a considerable amount of important information for the manufacturers of the appliances. Some studies were also made of the effect on the efficiency of water heaters of various features of construction and operation.

12 Absorption of Carbon Dioxide and Ammonia

An article on this subject, by P. G. Ledig of the Bureau of Standards, was published in the Journal of Industrial and Engineering Chemistry, Volume 16, p. 1231.

Two additional studies on the rates of absorption of gases by liquids are reported in this paper. The effect of concentration on the rates of absorption of carbon dioxide by potassium hydroxide solutions is shown. A modified form of the absorption apparatus is described and a study made with it on the rates of absorption of ammonia in water and ammonia solutions is presented.

13 The Specific Volume of Superheated Ammonia Vapor

A knowledge of the specific volume of ammonia vapor which, in the foot pound system of units, is the number of cubic feet occupied by one pound of ammonia vapor, is useful to the refrigerating engineer for calculation of the size of the ammonia compressor and pipe lines necessary for the production of ice or refrigeration at a desired rate.

In an investigation recently conducted by the Bureau, the specific volume of pure superheated ammonia vapor was measured with an accuracy of 1 part to 1000 or better, by weighing the amount of ammonia required to fill a container of known capacity at various temperatures and pressures. A temperature range from -35 to +300°C was covered, and a pressure range, from 1 to 30 atmospheres.

Although the range and accuracy are somewhat in excess of the present engineering requirements, history has shown that experimental data which only meet the requirements of their day, must soon be redetermined.

14 Aberrations of Long Focus Anastigmatic Photographic Objectives

Many users of camera lenses know from experience that the modern anastigmat excels other lenses in rapidity and fineness of definition. The reason for this excellence is found in the comparative freedom of the anastigmatic lens from certain errors, called aberrations, which are inherent to some degree in all lenses the surfaces of which are truly spherical. The anastigmatic type of lens is made of several component lenses, of different kinds of optical glass, with the surfaces of such curvature that these errors or aberrations of the component lenses almost neutralize each other. Yet, even in the high grade anastigmats there are aberrations which may be measured with the aid of refined laboratory instruments. An investigation conducted by the Bureau of the aberrations of a number of high grade anastigmatic lenses which were made by the world's best manufacturers, show that minute variations exist among individual lenses even when made by the same manufacturer, although these variations are not sufficiently large to be of any consequence when the lens is used for ordinary pictorial purposes. The results of these measurements of the aberrations should be of interest to designers of photographic lenses in that they show what is necessary for the further improvement of this type of lens. The subject is fully covered in Scientific Paper No. 494, copies of which may be obtained from the Superintendent of Documents at 20 cents apiece.

15 Research on Eye-protective Glasses

Several years ago the Bureau of Standards made an extensive examination of glasses for protecting the eye from ultra-violet and infra-red radiation. This work brought out the fact that the use of trade names on eye glasses merely confuses and mystifies the optician and the wearer, and is of doubtful value to the advertiser. For example, suppose a slight difference is found in the ultra-violet transmission of glasses having different trade names. Just as soon as this has been ascertained, it can be remedied by adding a few per cent of some absorbing substance, e.g., cerium oxalate, to the glass having the smallest absorption, and the discrepancy is remedied. The respective costs of production are then the only factors that are in competition.

Until recently emphasis has been placed upon glasses for out-of-doors wear, having selective absorption in the yellow-green of the visible spectrum. At present advertisers place emphasis upon uniformity of transmission in the visible spectrum, and high absorption of the ultra-violet rays. In view of the fact that the intensity of the ultra-violet rays in sunlight is relatively very weak, especially after reflection from objects, small variations in the ultra-violet transmission of glasses for wearing out-of-doors are unimportant.

About ten years ago, Crookes (Phil. Trans. Roy. Soc., London, A, 214, p. 35; 1914) showed that cerium oxide in glass exerted a strong absorption of the ultra-violet with practically no absorption of the visible rays. He used a soda-lime flux and cerium nitrate.

In view of the fact that in the Bureau's previous researches no sample of glass containing cerium had ever been knowingly examined, and in view of the apparant mystery surrounding the use of this material, the Bureau's glass plant prepared a sample of soda-lime glass (free from iron) into which was melted 7 percent of very pure cerium oxalate.

When cut to 2 mm. thickness and polished, this glass showed a faint yellowish tinge, transmitting nonselectively 85 to 88 percent of the visible rays and only 3 to 4 percent of the 365$m\mu$ line of the mercury arc, - being opaque to all the ultra-violet of shorter wave lengths.

From this it is evident that cerium in glass is as good an absorber of ultra-violet rays as any of the newly advertised glasses having mysterious trade names.

16 Correlation of Structural Conditions With Results of Notched Bar Tests of Metals

Single-blow and slow-bending notched bar tests of several metals and alloys rolled into flat plates and tested by the Bureau in its investigation of methods of notched bar testing, showed marked differences in results on specimens with the notch cut on the top or on the side of the plate. To explain the results, an extended metallographic study has been made of the specimens.

It is well known that the location of an impact test bar in relation to the direction of rolling, i.e., whether it is a longitudinal or a transverse bar, greatly affects the results, and that if both longitudinal and transverse bars are taken, the results throw much added light on the quality of the material. This series of specimens, all cut longitudinally, shows that the location of the notch on the top or side of a longitudinal specimen from a flat plate also throws much light on the directional properties of the material. The differences brought to light by the impact tests are shown to be directly connected with the number and type of inhomogeneities present, whether they be non-metallic inclusions or essential metallographic constituents. From one point of view, the work shows that the type of alloy used, or the presence of inclusions or dirt may greatly affect the reliability of the material for engineering uses when the material is stressed in different directions. From another it shows that impact tests on suitable specimens can be used to give information to the engineer on these directional properties, and that for the proper interpretation

of the results of impact tests the location of the notch in respect to directional inhomogeneities must be definitely known.

Many engineers question the real usefulness of impact testing because of alleged erratic results and the obscurity of the relation between test values and service. This work should be of value in showing a cause for results which appear erratic if superficially considered, but which, when correlated with the metallographic constitution of the material are not only not erratic, but throw valuable light on the usefulness of the material.

17 Increasing the Resistance to Wear of Gage Steel

The generation of internal stress in gage steel on quenching has been studied theoretically and experimentally on one type of steel. This has a bearing on the prevention of cracking of gages on quenching and on wear resistance. Wear resistance appears to increase with quenching temperature, in this type of steel, so that if means can be found to avoid cracking when a high quenching temperature is used, the wear should be decreased.

18 The Manufacture of "Malleable" Nickel and Nickel Alloys

In the manufacture of "malleable" products of nickel and certain nickel alloys, - such as forgings, rolled shapes, and castings,- rather unusual metallurgical treatments of the molten metal are resorted to in order that the cast product may be sufficiently malleable and ductile for the subsequent forging operations. The principal features of these treatments are the addition to the molten metal before casting, of small amounts of the metals magnesium and manganese. Nickel, without these additions, is not malleable either hot or cold, and will smash to pieces when hammered instead of squeezing out into the form desired.

Such "untreated" nickel, and nickel alloys, are brittle because of the presence of tiny amounts of sulphur,- as little as one part of sulphur in 20,000 of nickel being sufficient to spoil the material. This sulphur comes from the ore which originally contains far more sulphur than it does nickel, all but this tiny remnant of sulphur being removed in the refining process. The sulphur is combined with the metallic nickel as a compound which collects in the form of thin and brittle films around the grains of nickel. This compound melts at a low temperature,- hence the cohesion between the nickel grains is impaired by the presence of these films, brittle when cold, and, of course, having no strength when melted, and the metal containing such films is brittle and unworkable either hot or cold.

In an investigation just completed under an Industrial Fellowship at the Bureau of Standards, maintained by the International Nickel Company, it has been found that manganese and magnesium react with this harmful compound of nickel and sulphur, taking the sulphur away from its combination with nickel, and making new compounds of the sulphur with the manganese or magnesium. The new compounds have a high melting point and in addition take a form which affects the malleability but slightly. This form is made up of small particles uniformly distributed throughout the metal grains, instead of films in the metal mass.

19 Progress in Investigations of Electroplating

During the month considerable progress has been made in connection with several electroplating investigations, as follows:

The study of nickel plating on zinc base die castings is practically completed and the results are being compiled for publication.

Work on the protective value of nickel plating on iron and steel has led to a better understanding of the factors which are likely to cause porosity of the coatings. Further work is in progress to determine whether by appropriate means this porosity can be decreased.

The study of nickel electrotyping has shown that the composition and properties of the graphite have a very important bearing on the time of covering with nickel. Further work will be required to define the desirable properties of the graphite.

20 The Analysis of Phosphate Rock

An article on the analysis of phosphate rock, by G.E.F. Lundell and J.I. Hoffman of the Bureau of Standards was published in the Journal of the Association of Official Agricultural Chemists, Volume 8, pages 188-206.

Methods for the determination of moisture, phosphoric acid, "soluble iron and alumina", and calcium are given, together with results obtained in the analysis of the Bureau of Standards standard sample of phosphate rock by the use of these and other methods.

The use of boric acid is desirable in preparing solutions for the analysis of phosphate rock, for this lessens the hydrofluoric acid attack on glassware and prevents the interference of this acid in determinations of phosphorus.

Results obtained by solution of the ammonium-phosphomolybdate precipitate and a single precipitation with magnesia mixture can not be correct except through compensating errors, for the precipitate always contains molybdenum and is rarely of ideal composition. If magnesia is added too slowly to neutral or ammoniacal solutions of phosphate, the re-

sults are usually low. For accurate analyses, solution of the magnesium ammonium phosphate precipitate is recommended, followed by the addition of 2 to 3 cc of magnesia mixture and reprecipitation by ammonia.

In the alkalimetric method for phosphorous, the solution should not be heated after the addition of the molybdate reagent. The 23 : 1 ratio can not be used in calculating the phosphorous titre of the sodium hydroxide solution unless the method is carefully worked out and followed to the letter.

It is not difficult to get concordant results for "soluble iron". The determination of "soluble alumina", on the other hand, requires rigid attention to a definitely defined method of solution and careful analysis if comparable results are to be obtained.

21 Standard Samples

The machining of the renewal No. 12c of Standard Sample of Basic Open Hearth, 0.4 per cent Carbon Steel has been completed, and the sample sent to the cooperating analysts.

The machining of renewal 5e of Cast Iron has also been completed, and the sample is now being sieved and crushed. The analysis of this sample will be started very soon.

Some bauxite ore has been procured for the preparation of a standard sample of aluminum ore. This has been crushed so as to pass a No. 80 sieve, and preliminary experiments have been made to determine the proper drying temperature. Two cylindrical castings for the renewal of Cast Iron No. 7a have been received from the American Cast Iron Pipe Co., Birmingham, Alabama.

The preparation of the renewal of Benzoic Acid, Standard Sample No. 39b is progressing satisfactorily, and the renewal will be ready when the present sample is exhausted.

22 Reduction of Number of Sizes, Styles, and Finishes of Brass Lavatory and Sink Traps

For the past two or three years the manufacturers of brass lavatory and sink traps have been convinced that the steadily increasing variety of sizes, styles and finishes of these commodities has become an unnecessary burden on the industry, and therefore an avoidable economic waste.

At a preliminary meeting of the manufacturers to consider steps for reducing this diversity, data were presented by five producers which showed that of the 1,114 combinations then manufactured 382 represented 98½% of all sales. The remaining 732 combinations, therefore were carried to meet a 1½% demand.

The Department of Commerce was requested to call a

general conference of all interests to discuss and agree upon a reduction of varieties to be carried in future as stock items. The result of this conference was the elimination of all but 72 items. In addition the conference recommended that the industry use but two gauges, number 17 and 20, and the stamping on each article the name of the manufacturer and the gauge.

This recommendation became effective January 1, 1925.

23 Simplified Practice Recommendation Covering Blackboard Slate

Simplified Practice Recommendation No. 15 of the Bureau of Standards, Division of Simplified Practice, covering the recognized sizes and applications of slate for fixed and portable blackboards, and for school, score, bulletin, and memorandum purposes, was recently published by the Government Printing Office.

For some time there has been a real need for an understanding, on the part of the consumers, of the problems faced by producers of slate. It has been clearly desirable that a limit be set to standard sizes, and that the number of such sizes be reduced to the lowest minimum consistent with current demand and conditions. Such a bond of understanding between quarrymen and ultimate consumers will assist in conserving one of our natural resources, and will expedite deliveries. Also, it will materially contribute to the avoidance of slack seasons and the attendant laying off of labor, for, with a dependable and organized future demand in view, it will be possible to quarry slate for stock. Adherence to this recommendation will make it unnecessary to wait for specified sizes while there is an accumulated finished stock of other usable sizes available and immediately accessible.

This program was drafted by the National Slate Association in conference with allied interests last July, under the auspices of the Division of Simplified Practice and recommends a reduction from 30 heights to 5 for fixed wall blackboards, a reduction from 141 sizes of portable blackboards to 14, and a reduction from 30 sizes of school, score, and memorandum slates to 8; corresponding to respective elimination of 96.6%, 90% and 60%.

This is the third recommendation that has originated in the slate industry, the others being Simplified Practice Recommendation No. 13, covering structural slate for plumbing and sanitary purposes, and Simplified Practice Recommendation No. 14, covering the sizes and nomenclature of roofing slate. The three publications are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C.

24 The Use of the Electron Tube Peak Voltmeter for the Measurement of Modulation

In an article by Dr. C.B. Jolliffe, of the Bureau of Standards, which appeared in the December issue of the Journal of the Optical Society of America and Review of Scientific Instruments, under the title "The Use of the Electron Tube Peak Voltmeter for the Measurement of Modulation," a method of using the electron tube voltmeter for the measurement of the percent modulation of a radio-frequency current is given. In using this instrument it is necessary to measure the peak values of the unmodulated and modulated radio-frequency current. The percent modulation can then be calculated. Data are given to show the reliability of the method. The primary use of this device is for making measurements for scientific studies, but it should also prove useful in a radio telephone transmitting station.

25 Standard Frequency Radio Signals

The following stations have been found during the past month to maintain their transmissions so nearly on the assigned frequency as to be available for radio frequency standards:

Station	Owner	Location	Assigned frequency (kilocycles)	Period covered by measurements (months)	Number of times measured	Deviations from assigned frequencies noted in measurements since Nov.20, '24	
						Average	Greatest
						Per Cent	Per Cent
NSS	United States Navy	Annapolis, Md.	17.50	16	118	0.2	0.1
WGG	Radio Corporation of America	Tuckerton, No.1, New Jersey	18.86	16	135	.2	.2
WII	Do	New Brunswick, N.J.	22.04	15	108	.2	.1
WSO	Do	Marion, Mass.	25.30	16	97	.3	.4
WWJ	Detroit News	Detroit, Mich.	580	15	40	.1	.2
WCAP	Chesapeake & Potomac Tel. Co.	Washington, D.C.	640	15	74	.1	.2
WRC	Radio Corporation of America	Do	640	12	47	.1	.0
WSB	Atlanta Journal	Atlanta, Ga.	700	15	61	.2	.1
WGY	General Electric Co.	Schenectady, N.Y.	790	18	102	.1	.1
WBZ	Westinghouse Elec.& Mfg. Co.	Springfield, Mass.	890	8	20	.0	.0
KDKA	Do	E.Pittsburgh, Pa.	920	15	130	.1	.1

PUBLICATIONS OF THE BUREAU OF STANDARDS RELEASED DURING DECEMBER

Scientific Papers

S 493 Ultra-violet reflecting power of some metals and sulphides, W. W. Coblentz and C. W. Hughes 5¢

S 494 Aberrations of long focus anastigmatic photographic objectives, A. H. Bennett 20¢

Technologic Papers

T 264 Development of the standard numbered cotton duck specification, study of methods of tests and tolerances, C.W.Schoffstall and R. T. Fisher 10¢

T 265 Theory and performance of rectifiers, H.D. Holler & J.P. Schrodt 20¢

T 267 Effect of hot-rolling conditions on the physical properties of a carbon steel, John R. Freeman,Jr., and A.T. Derry 10¢

Miscellaneous Papers

M 58 Technical Conference of State Utility Commission Engineers 15¢

Simplified Practice Recommendations

R 14 Elimination of waste, roofing slate 5¢

R 19 Elimination of waste, asbestos paper and asbestos millboard 5¢

Limitation of variety recommendation number 1, elimination of waste, paints and varnishes 5¢

These publications can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the prices given above.

Respectfully,

George K. Burgess,
Director.
HGB